

Serial No. 10/673,609  
Amendment  
Response to Final Office Action mailed July 16, 2007

Docket No. ASA-901-02

### **REMARKS**

#### **Pending Claims**

Claims 11-12, 14-17, 19-22 and 24-30 are pending in this application.

#### **Claim for Priority**

Applicants request that the Examiner officially acknowledge the claim for priority and safe receipt of the certified priority document (JP 2000-030217), which was filed in the parent application Serial No. 09/639,755.

#### **Claim Rejections under 35 U.S.C. §103**

Claims 11-12, 14-17, 19-22 and 24-30 were rejected under 35 U.S.C. §103(a) as being unpatentable over Milligan et al., U.S. Patent No. 5,210,866, and further in view of Bachmat et al., U.S. Patent No. 6,237,063.

#### **Pending Claims**

Claims 11, 16, 21, 24 and 27 have been amended. No claims have been canceled and no new claims have been added. Accordingly, claims 11-12, 14-17, 19-22 and 24-30 are pending in this application. No new matter has been added.

#### **Claim for Priority**

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**Claim Rejections under 35 U.S.C. §103**

Claims 11-12, 14-17, 19-22 and 24-30 were rejected under 35 U.S.C. §103(a) as being unpatentable over Milligan et al., U.S. Patent No. 5,210,866, and further in view of Bachmat et al., U.S. Patent No. 6,237,063. Applicants respectfully request reconsideration and withdrawal of the rejections for the following reasons.

In the present invention, a host computer stores data in a first logical volume and stores a backup copy of the data stored in the first logical volume to tape, at a certain point in time. Data recovery includes selection of an unused second logical volume corresponding to a second physical storage area and reading a backup copy of the data at the certain point in time from the tape to the second physical storage area, thereby restoring a copy of the first logical volume at the certain point in time to the second logical volume. Then, the host instructs the controller to relate the second logical volume in the second physical storage area to the first logical volume in the first physical storage area according to a swap request by exchanging positional information of the second logical volume with positional information of the first logical volume. Applicants have amended independent claims 11, 16, 21, 24 and 27 to clarify that the backup copy that is read from the tape to the second logical volume is the backup copy of the data made at the certain point in time.

Milligan discloses a storage system including a host processor, data storage subsystem and tape drive. However, Milligan does not disclose reading a backup copy of data made at a certain point of time from the tape drive to a second logical volume that is in a second physical

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storage area in combination with relating the second logical volume in the second physical storage area to a first logical volume in a first physical storage area according to a swap request, as claimed by Applicants.

Milligan discloses a control unit of the data storage subsystem, as shown in Figure 2, having a processor 204-0 that regulates the operation of the storage path 200-0 between the channel interface units 201-0 to 201-7 and the cache 113. The software in processor 204-0 manages mappings from virtual to logical devices, and from logical to physical devices. See column 8, lines 27 – 34, of Milligan for example. The control unit shown in Figure 2 is relied upon by the Examiner for disclosing the swap/switch of a backup disk drive for a failed disk drive. See the Office Action, page 9, lines 11-13. Applicants disagree that Milligan discloses a swap request that includes exchanging positional information of the first logical volume with that of the second logical volume, however. Applicants respectfully assert that Milligan merely discloses that a failed disk drive can be replaced with a spare disk drive from a pool of spare drives; and that the data of a redundancy group or logical disk drive to which the failed disk drive belongs can be reconstructed in a manner that is well known in the art and described at column 6, lines 42 – 62 of the reference.

The reconstruction of data disclosed by Milligan is not done with respect to data stored to a tape at a certain point in time. That is, the reconstruction of data in Milligan does not involve reading a backup copy of data made at a certain point in time from a tape to a second logical volume that is then related to a first logical volume by a swap request that exchanges positional information of the first logical volume with that of the second logical volume.

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According to claims 11, 16 and 21, the exchanging of positional information of the second logical volume with positional information of the first logical volume results in the data of said first logical volume being interchanged with data of the second logical volume and the controller accessing the second physical storage area when the controller receives an access request to the first logical volume from the host computer. Further, according to claim 24, the exchanging of positional information between the partial logical storage area in the first logical volume and the another partial logical storage area in the first logical volume with each other results in the data in the partial logical storage area in said first logical volume to be interchanged with data in said another partial logical storage area. In claim 27, the interchanging of the mapping information of the first logical areas of the first logical volume with the mapping information of the second logical areas of the second logical volume results in the first logical areas of the first logical volume to be mapped to the second physical storage areas so that the data in the first logical areas of the first logical volume is interchanged with the data in the second logical areas of the second logical volume and when the host accesses the first logical areas of the first logical volume, the second physical storage areas are accessed. Accordingly, Milligan does not disclose the swap request which exchanges positional information as claimed in the independent claims.

Bachmat has been cited in combination with Milligan. Bachmat is relied upon for teaching the swapping of logical volumes on the same physical disk storage device and selecting first and second logical volumes on different disk storage devices to be exchanged, referring to column 3, lines 29-45 of the reference. In particular, Bahmat discloses exchanging data between first and second logical volumes by transferring the data through first and second

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buffer volumes. In other words, this type of data exchange requires the use of buffer volumes, which is not is not equivalent to the claimed swap request performed by exchanging positional information of the first logical volume with that of the second logical volume, as claimed by Applicants. According to the rejection, it would have been obvious to one having ordinary skill in the art at the time of the invention to combine the teaching of Bachmat to allow the swapping/switching/exchanging of logical volumes in order to provide a spare disk drive to be switched and used when there is a disk failure, as taught by Milligan. However, the combination of Milligan and Bachmat does not disclose to one having ordinary skill in the art to store a backup copy of data to a tape at a certain point in time and reading the backup copy made at the certain point in time from the tape to a second logical volume in combination with relating a second logical volume to a first logical volume according to a swap request by exchanging positional information of the first logical volume with that of the second logical volume, as claimed by Applicants.

Therefore, combining the teachings of Milligan and Bachmat in the manner suggested in the Office Action does not render obvious the features of the present invention, as recited in claims 11-12, 14-17, 19-22 and 24-30 . Accordingly, reconsideration and withdrawal of the 35 U.S.C. §103(a) rejection of claims 11-12, 14-17, 19-22 and 24-30 are respectfully requested.

### **Conclusion**

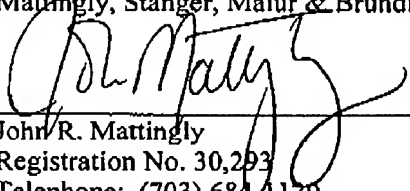
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In view of the foregoing, Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Respectfully submitted,

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